DOE SSL Market Introduction Workshop

LED Lighting Specifications and Information

Accelerating success.

Our Markets Overview

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Colliers International Statistics

- **Revenues: $1.8 Billion**
- **Countries: 62**
- **Offices: 522**
- **Professionals: 12,300**
- **Brokers: 4,800**
- **Square Feet Managed: 1.25 Billion**
- **Leases/Sales Transactions: 76,000**
- **Total Transaction Value:**

  $68 Billion

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Why Sustainability Matters Most

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

- Jayelynn Amorette Allen:

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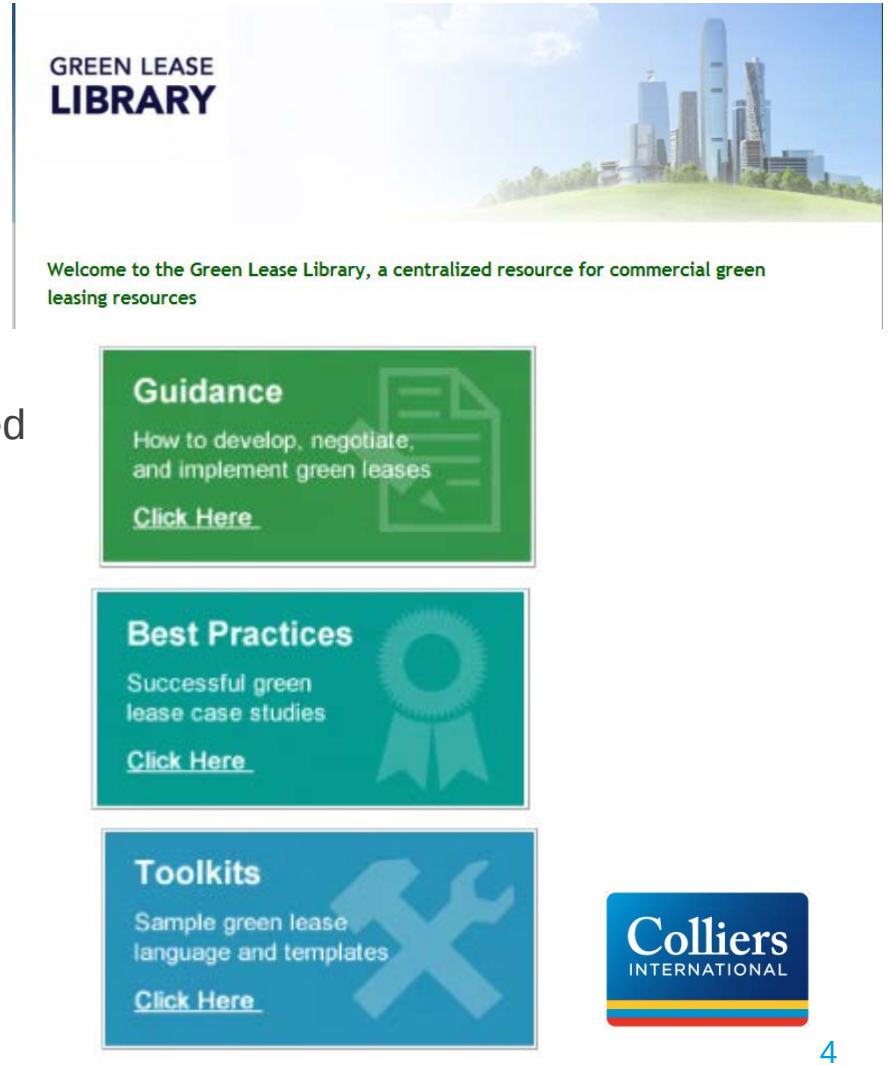
Colliers International and the CBEA Green Lease Library

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

- Collaboration with 7 green leasing stakeholders (e.g. BOMA, IMT)
- Aggregated top green leasing resources into a website
- Hosted a green leasing webinar
- 11 CBEA member organizations have implemented green leasing practices
- What's Next?

- Sharing best practices within and beyond CBEA
- Identifying additional leasing barriers to be addressed by CBEA

www.greenleaselibrary.com



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CBEA Site Lighting Specification

- Collaborated with CBEA team to develop the specification
- Conducted research on customer satisfaction and security implications
- Adopted the specification across Walmart's new building portfolio
- Over 400 CBEA member sites have applied the specification to date with savings of over 50 tWh
- What's Next? Encouraging broader adoption through BOMA/GPC/IFMA Campaign

Leavenworth, Kansas

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LED Site Parking Lot Lighting Project

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Main Barriers:

- Case studies including Gateway Demonstration Assessment of LED Parking Lot Lighting: Wal-Mart, Leavenworth KS and a Fact Sheet Application Considerations for LED Site Lighting Projects Using the CBEA Performance Specification: A Review of DOE Gateway Demonstrations address barriers
- ROI Around 5 yrs. but is improving. Financing is especially challenging for those with leased sites. (NEW barrier being addressed)

Solutions:

- High Efficiency Exterior Lighting Campaign – DOE, IFMA, BOMA, GPC partner to increase adoption of high efficiency parking lot and parking structure lighting by encouraging their membership to adopt lighting performance levels consistent with CBEA Specifications and by offering new resources that address the financial and business case barriers.
- Specification: CBEA LED Site Lighting Specification Version 1.3 with savings of about 50%;75% or more controls was developed by CBEA members and vetted with manufacturers to address barriers

Deployment Pathway:

- CBEA Members: Wal-Mart uses the specification portfolio wide for all new buildings and retrofits when applicable. Regency Centers, Lowe's, and PNC Financial Services Group have sites in the design stage. 19 others are investigating it.

Before LED Lighting

After LED Lighting

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High-Efficiency Parking Structure Lighting Project

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Main Barriers:

- Building owners unsure of what to require in parking lots using LEDs (Product and Performance /Design requirements)
- No specification to reference in RFP materials.
- Unfamiliarity with the technology and need to better understand its performance in actual parking lots, and the inherent challenges/lessons learned from demonstration projects.
- ROI Around 5 yrs. but is improving. Financing is especially challenging for those with leased sites. (NEW barrier being addressed)

Solutions:

- High Efficiency Exterior Lighting Campaign – DOE, IFMA, BOMA, GPC partner to increase adoption of high efficiency parking lot and parking structure lighting by encouraging their membership to adopt lighting performance levels consistent with CBEA Specifications and by offering new resources that address the financial and business case barriers
- Specification: CBEA High-Efficiency Parking Structure Lighting Version 1.1 with lighting energy savings of about 40%, and even greater savings if lighting controls and daylighting are applied, address the following barriers:

Deployment Pathway:

- CBEA Members: Cleveland Clinic and NREL each have completed sites. USAA Real Estate and Wal-Mart have sites in the design stage, and 20 others are at various stages of pursuing site(s).

Impact Metrics:

- The total energy savings against company standard practice or energy use before renovation for the 2 CBEA member sites (2 organizations) that have applied the CBEA specs (design or completed construction) is estimated at 1,735,540 kWh.

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High-Efficiency Troffer Lighting

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Main Barriers:

•Lack of guidance on what to require from vendors in high efficiency LED troffer luminaires.

Solutions:

•Specification: CBEA High-Efficiency Troffer Lighting Version 3.0 (completed 2/15/12) and Fact Sheet: CBEA High-Efficiency Troffer Lighting Specification. Potential savings from applying the specification range from 15–45% on a one-for-one basis and up to 75% with the use of controls. Fifty percent of all commercial fluorescent lighting fixtures are recessed troffers in 2′x4′, 2′x2′ and 1′x4′ configurations, in operation for more than 10 hours a day on average and collectively consuming more than 87 terawatt-hours of electricity annually.

- Outreach to date:
- Webinar: High-Efficiency Troffer Specification [616 attendees]
- Webinar: High-Efficiency Troffer Specification [531 attendees]

Deployment Pathway:

•GSA applied the spec in a demonstration site in San Francisco. Colliers and HealthSouth are considering the spec.

•U.S. General Services Administration (Project Chair), Cleveland Clinic, Wendy's/Arby's Group Inc., Cushman & Wakefield Inc., USAA Real Estate Co., CB Richard Ellis Group, Inc., Sinai Health System, IMCOM, IES, SUPERVALU INC., Target Corp., The Home Depot, Inc. and Macy's Inc. are members of the project team.

Cree CR22™ Recessed Troffer Using Solid-State Lighting Technology

Impact Metrics:

- Number of members and others applying the specification.
- Number of utilities offering incentives for troffers that meet the specification.

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Refrigerated Display Case Lighting

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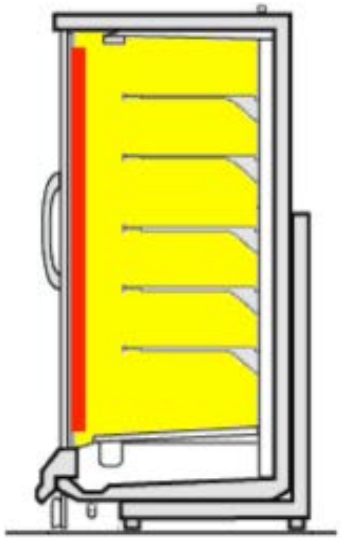
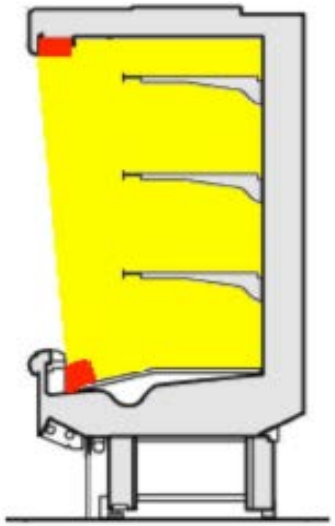
The refrigerated display case specification delivers nearly 50% energy savings compared to typical display case lighting. If all retail refrigerated display cases switched today to LED systems, over 2.1 TWh of electricity could be saved annually.

Enclosed cases with one or two types of luminaires installed vertically on mullions:
1. Symmetric (middle)
2. Asymmetric (case ends)



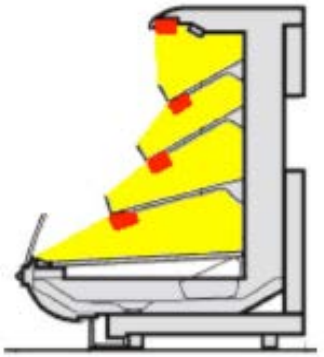
LED luminaire typically replaces a fluorescent luminaire with one-lamp cross-section.

Open cases with one or two types of asymmetric luminaires installed horizontally:
3. Down (under canopy)
4. Up (floor of case, like #2)



LED luminaire typically replaces a fluorescent luminaire with two-lamp cross-section. High-end retailers will sometimes have a third lamp in the canopy or add another lamp at bottom of case.

Open cases with one or two types of luminaires installed horizontally:
5. Under-shelf (like #1)
6. Under-canopy (like #3)



LED luminaires typically replace fluorescent luminaires with single-lamp cross-section under shelves and two-lamp cross-section under canopy.

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Lessons Learned and Conclusions

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- Lack of industry consensus on light levels
- Manage perceptions about LEDs versus metal halide
- Design and procurement process inefficient
- LED more feasible with lower light levels, shorter pole heights, and/or shorter distances between poles

  Can not compete on a costs basis with 750W or higher metal halide
- Interested in using lighting controls – LEDs can be dimmed and offer other potential benefits
- Will continue to consider LED, but first cost still big driver in decision making

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Highlights from the Lighting Team's June 20, 2012 Report

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

- **Energy Savings Summary**

The total energy savings against company standard practice or energy use before renovation for the 793 CBEA member sites (8 organizations) that have reported applying the CBEA specs (design or completed construction) is estimated at 57,289,755 kWh per year. At 10 cents per kWh, that represents energy savings of over $5 million per year - not accounting for the savings from members and others who have utilized the specifications but not reported energy savings results.

- **LED Parking Lot Lighting Specifications Deployment**

- A number of CBEA members reported activity related to the specification. New reports form CBEA members include:

  -Safeway is investigating the use of the CBEA specification for moving from HID to LEDs in their parking lots.

  -McDonald's planning to use the CBEA specification in upcoming RFP for new stores.

  -Colliers is reviewing the specs.

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Highlights from the Lighting Team Activities

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- **High Efficiency Parking Structure Specification Deployment**

Cleveland Clinic's million-square-foot parking structure (bay-by-bay design) is now complete. They have six months of test data and beat the model. Payback was 3.2 years, and they have easily surpassed this.

- **High Efficiency Troffer Specification Development**
- HealthSouth is reviewing the specification for plans to build 10 rehab hospitals this year.
- CBEA High-Efficiency Troffer Lighting Specification webinar was held on 4/19/2012 to discuss the newly released specification [600 attendees].
- Coloration issues due to architectural design
- **Occupancy Based Office Sensors**
    - Code issues

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Taking our Lighting Specs Downstream:

High Efficiency Lighting Specifications meet the Parking & Building Management Industries

High Efficiency Exterior Lighting Campaign

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The Compelling Argument to deploy according to our CBEA organization members, BOMA, IFMA, and GPC are :

- Energy savings of over 30% compared to ASHRAE 90.1-2010, and 50% or more compared to earlier codes. Add controls and daylighting to save even more.
- Reduced maintenance, user satisfaction
- Accelerated uptake of new technologies
- Creating the successful case studies for:
  - Smaller organizations
  - Complicated management structures

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High Efficiency Exterior Lighting Campaign

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CBEA members, BOMA, IFMA, and GPC Goals are:

- Increase the number of parking lots and parking structures that deliver attractive lighting while saving energy and money
- Document best practices and resulting energy savings
- Recognize successes
- Help companies make business case
- Usability testing
- Inspire evangelists

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High Efficiency Exterior Lighting Campaign

Questions CBEA members, BOMA, IFMA, and GPC are looking to answer

- What are the obstacles to adoption and how do we overcome them?
- How do the specifications work in the marketplace?
- What inhibits the market?
  - Lack of knowledge?
  - Long term ROI?
  - Disconnects between building owner, building manager and parking operator?
- How do we create evangelists?
- What's the role of lighting vendors and installers?
- How do we best build this collaboration?

High Efficiency Exterior Lighting Campaign

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Available Resources:

- CBEA lighting specifications
- M&V guidance
- Gateway demonstrations
- Financial tools (coming soon)

Recognition for:

- Best implementation model across a portfolio
- Best application of controls
- Greatest energy savings: single site, and portfolio-wide

Official Launch Fall 2012

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Quote:

”The Greatest use of life is to spend it for something that will outlast it.”

- William James